Claims

1. A process for producing calcium compounds containing water of crystallisation, the process being characterized in that

a) by a chemical reaction between an aqueous alkaline solution of sodium aluminate and a solid or dissolved and suspended, respectively, calcium (hydr)oxide in the presence of carbon dioxide or carbonate a precipitate of a mixture of calcium aluminatehydrates having the following modular formula is formed:

$xCaO \cdot Al_2O_3 \cdot zCaCO_3 \cdot yH_2O$ (wherein x = 3-6, y = 6-32, z = 0-1) and

b) the thus obtained precipitate, in a manner known per se, is separated by sedimentation, dehydrated, optionally washed with water and the thus obtained filter cake is either dried and/or calcined and/or milled,

c) or the filter cake obtained in step (b) in a wet and/or dried form is suspended in water and added with at least one mineral acid and/or at least one salt thereof for forming a calcium aluminatesalt precipitate containing water of crystallisation, the precipitate is separated by sedimentation, dehydrated, optionally washed with water and the thus obtained filter cake is crushed and optionally dried and/or milled.

2. The process according to claim 1, characterized in that as an aqueous alkaline sodium aluminate solution a waste pickling lye is used as obtained by surface-treatment of aluminum metal.

3. The process according to claim 1 or 2, characterized in that an aqueous alkaline sodium aluminate solution and a waste pickling lye, respectively, is

used wherein Na_2O and Al_2O_3 are present in a mole ratio of (1.0 to 10.0):1, preferably of (1.2 to 2.5):1.

4. The process according to at least one of claims 1 to 3, characterized in that in step (a) an aqueous alkaline sodium aluminate solution is used as a starting material and calcium (hydr)oxide is added thereto.

5. The process according to at least one of claims 1 to 3, characterized in that in step (a) calcium (hydr)oxide is used as a starting material and then the aqueous alkaline sodium aluminate solution is added.

6. The process according to claim 4 or 5, characterized in that from 2 to 8 mole of CaO equivalents, preferably from 3 to 5 mole of CaO equivalents, based on 1 mole of Al_2O_3 equivalent, are added.

7. The process according to at least one of claims 1 to 6, characterized in that the precipitation of the precipitate in step (a) is carried out within a reaction time of from 5 to 3000 min, preferably from 60 to 600 min, at a temperature of from 5 to 60°C, preferably from 30 to 50°C.

8. The process according to at least one of claims 1 to 7, characterized in that the calcium aluminatehydrate precipitate in step (b) is mechanically dehydrated, preferably by using a pressure filtration, in particular by using a chamber filter press or a membrane filter press and, alternatively, by using a vacuum belt filter or a centrifuge.

9. The process according to claim 8, characterized in that the dehydrated calcium aluminatehydrate precipitate at a temperature of < 100°C is dried and crushed, preferably milled.

10. The process according to claim 8, characterized in that the dehydrated calcium aluminatehydrate precipitate at a temperature of from 100 to 1300°C,

preferably from 100 to 500°C, is dried and calcined, respectively, and crushed, preferably milled.

11. The process according to at least one of claims 1 to 8, characterized in that the dehydrated and optionally washed filter cake of step (b) is suspended in water and added with at least one mineral acid and/or at least one salt thereof to form an extra white calcium aluminatesalt precipitate containing water of crystallisation, the precipitate optionally being further processed according to claim 9 or 10.

12. The process according to claim 11, characterized in that as a mineral acid hydrochloric acid, hydrofluoric acid, sulfuric acid, silicic acid and/or carbonic acid and salts thereof, respectively, in particular their alkaline metal salts, alkaline earth metal salts and aluminum salts are used.

13. The process according to claim 12, characterized in that as a mineral acid a sulfuric acid containing aluminum, preferably a waste acid derived from eloxal plants is used.

14. The process according to claim 11, characterized in that in step (b) a sulfate is added to the filter cake suspended in water in a ratio of 1 part by weight of Al to 4 to 7 parts by weight of SO_4, based on the total aluminum content.

15. The process according to claim 14, characterized in that anions of the further mineral acid(s) mentioned in claim 12 and/or salts thereof are additionally added in amounts of 1 part by weight of Al to 0.5 to 10 parts by weight of anions, based on the total aluminum content of the suspension.

16. Use of the products obtained in the process according to any of claims 1 to 15 in the form of an aqueous suspension and/or in solid form as an extra white pigment for surface-coating of paper or as a filler in the production of pa-

per or in the production of paints and lacquers, preferably for indoor and outdoor uses.

17. Use of the products obtained in the process according to any of claims 1 to 15 as a flame-retardant filler for fire-protecting construction materials, insulating materials, mortars, wallpapers, paperboards, papers, for the production of paints and lacquers, as a filler for producing plasterboards or building slabs or as an hydraulically active additive for producing swelling cements, swelling plasters and screeds, for microfiber armation of cements and mortars or as a swelling component for the production of explosion-protected explosives.

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